Solid Mechanics-Inspired Sensor-Based Motion Planner

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Summary

In this paper a motion planner capable of laying a trajectory for a robot operating in a complex, stationary, unknown environment based on the sensory data it acquires online from its finite range sensors is suggested. The planner utilizes concepts from the area of mechanics of solids to generate the navigation field. A new setting for the biharmonic potential field approach to planning (K. Hashimoto et al., 2000) is suggested. The new setting makes it possible to gradually feed the parts of the environment, as they are discovered online by the sensors of the robot, to the biharmonic potential-based planner. Theoretical developments of the method as well as simulation results are provided